



## High Energy™ & Hi-Tech™ Hydraulic Lifters

**Applicable Part #s:** 802-12, 812-8, 812-12, 812-16, 820-12, 822-12, 822-16, 824-16, 832-12, 832-16, 834-12, 834-16, 842-8, 846-8, 852-16, 855-16, 864-8, 864-16, 869-12, 869-16, 880-16, 882-16, 884-16, 886-16

Thank you for choosing COMP Cams® products; we are proud to be your manufacturer of choice. Please read this instruction sheet carefully before beginning installation, and also take a moment to review the included limited warranty information.

The following instructions cover the correct procedures for installing COMP Cams® High Energy™ or Hi-Tech™ Hydraulic Lifters or Hydraulic Roller Lifters. The High Energy Lifters™ can be used with adjustable and non-adjustable valve train setups. Although the method for setting pre-load on a hydraulic flat tappet and hydraulic roller lifter is the same, the break-in procedure for each lifter is not. Please review this break-in procedure for flat tappet camshafts.

**Important: On hydraulic flat tappet cams that require dual valve springs, the inner spring must be removed during break-in. Also, we do not recommend the use of synthetic motor oils during the break-in process.** COMP Cams® recommends using Part #1590 (10W-30) or #1591 (15W-50) Engine Break-In Oil. Other non-synthetic, heavy-duty motor oil along with COMP Cams® Part #159 Break-In Oil Additive may be used. This allows the lifters to establish rotation and develop a good wear pattern. As soon as the engine fires, bring the RPM up to 2000 to 2500 during the first 30 minutes of operation. Slower engine speeds will not supply the camshaft with an adequate amount of oil for the break-in period. The engine RPM may be varied periodically from 2000 to 2500 to direct oil splash to different areas of the camshaft.

After the 30 minute break-in period, change the oil and filter to be sure all contaminants from the initial break-in period are removed from the engine. Refill crank case with COMP Cams® Part #1594 (10W-30) or #1595 (15W-50) Muscle Car & Street Rod Oil or other quality name brand oil with the addition of COMP Cams® Part #159 Break-In Oil Additive. COMP Cams® Oil, as well as the Break-In Oil Additive, will assist with ring seal during the early break-in period of your engine. The inner valve springs can now be replaced.

### **Setting Hydraulic Lifter Pre-load:**

The correct amount of lifter pre-load is important to help efficiently control the valve train. Insufficient pre-load will cause valve train noise, while too much pre-load may damage the hydraulics of the lifter or cause low manifold vacuum. By following the four steps listed below you will help ensure proper engine performance and reliability.

## Instructions:

1. **Lifter Preparation:** Remove your new COMP Cams® lifters from the packaging and clean them thoroughly in mineral spirits or an equivalent solvent. Remember, in order to protect your camshaft warranty, new COMP Cams® lifters **MUST** be installed on flat tappet cams. It is not necessary to “pre-pump” hydraulic lifters full of engine oil prior to installation and valve adjustment. It is actually undesirable to do so as the “pumped up” lifters will cause the valves to open during the adjustment process, rather than positioning the lifter plunger in its operating position as it is supposed to do. “Pre-soaking” hydraulic lifters in a bath of engine oil is a good idea, but not mandatory. Doing so ensures that the lifters are adequately lubricated on their outer surfaces prior to installation. It may also result in a quieter engine start-up as the oil in the bath may displace some air from the lifter’s plunger reservoir.

Coat the bottoms of all flat tappet lifters with COMP Cams® Cam and Lifter Installation Lube (Part #103) supplied with flat tappet cams. When you install the lifters, make sure they fit well. Flat tappet lifters should rotate freely in the lifter bores. Any excess clearance or tight lifters can cause damage to the camshaft, leading to engine failure. **Note: Contact your engine builder or block manufacturer for your specific clearances.**

2. **Setup:** With your cam installed, simply place the prepped lifters into the lifter bores. If you are using hydraulic rollers with a link bar, pay close attention to which direction the link bar faces. The link bars on retro-fit lifters should face towards the valley of the block. If the link bar has an arrow on it, make sure the arrow is pointing upwards (↑). If your engine block was originally equipped with hydraulic rollers, make sure the High Energy Lifter™ roller wheel is positioned to roll along the camshaft lobe. Failure to do so will result in camshaft damage and improper oiling. Now that the lifters are in place, you can begin to install the pushrods and rocker arms.
3. **Pushrod and rocker arms:** Clean all pushrods thoroughly because most engines oil through the center of them. If the original pushrods are being used, be especially sure that they come clean inside and out. Apply a small amount of COMP Cams® Engine Assembly Lube (Part #102) or an equivalent lube on each end of the pushrods, and install them into the engine. Clean all rocker arms thoroughly. If the original rocker arms are being used, examine each one for excessive wear, and replace any that are questionable. Apply a small amount of lube on all contact areas of the rocker arm. With a clean rag or towel, wipe the tips of the valves clean and apply lube to them where the rocker arms will come in contact with them. Also be sure to check the valve stem tips for excessive wear. Next, install the rocker arms. Make sure the pushrod is in the lifter and the rocker arm seat when making valve adjustments.
4. **Adjusting pre-load:** COMP Cams® High Energy Lifters™ can be used with adjustable and non-adjustable valve train designs. However, each type of valve train has its own set of procedures for setting pre-load. This section is divided into two parts: Section I describes adjusting pre-load with an adjustable valve train, while Section II explains adjusting the valves using a non-adjustable valve train.

## Section I. Setting pre-load with ADJUSTABLE ROCKER ARMS

Turn the engine in the normal direction of rotation. Start with cylinder number one (1). When the exhaust valve begins to move, adjust the intake valve to the correct pre-load. To reach zero, take the pushrod between your finger tips and move it up and down while you tighten the rocker arm. Once you feel the pushrod has no more vertical slack, you are at zero pre-load. Make sure the pushrod is in the lifter and the rocker arm seat when making valve adjustments. The **recommended pre-load** setting is .030" plus or minus .010" or approximately a half turn on the poly-lock. Now you can move on to the exhaust valve on the same cylinder. Begin by rotating the engine over again until the intake valve reaches maximum lift and is almost all the way back down. Then set the exhaust valve using the same method as the intake (.030" plus or minus .010"). Continue adjusting the valves on each cylinder in this manner until all the valves are adjusted.

## Section II. Setting pre-load with NON-ADJUSTABLE ROCKER ARMS

A different procedure is required to set hydraulic lifter pre-load on engines with non-adjustable rocker arms. First, install the pushrods and torque all the rocker arm bolts down in the proper sequence and torque specification. Rotate the engine by hand in the normal direction of engine rotation until both the exhaust and intake valves have opened and closed completely. Allow a couple of minutes for the lifters to bleed down.

Using the valve cover gasket surface on the head as a reference point, place a mark on the pushrod. The smaller, more defined the mark, the more accurate the measurement. Be sure the reference point you choose for the first mark is easily accessible and easy to duplicate. The pushrod will be marked twice. It must be measured from the same reference point and angle for the measurement to be accurate.

Loosen the rocker or rocker shaft bolts. Leave the rockers on the head so that they will support the pushrods. Be sure the pushrods are standing free in the lifters and do not have any pre-load. Using the same reference point, place a second mark on the pushrod. Make sure the angle and reference point are the same as the first mark.

You now have two marks on the pushrod: one with the assembly bolted into place as the engine will run and one with the lifter unloaded. The distance between these two points will represent the amount of lifter pre-load. If the pre-load is not within .020-.080," adjustment is necessary. The simplest way to accomplish this is by using different length pushrods. When measuring to find the correct length needed, be sure to include the .020-.080" pre-load that the lifter requires. If the engine uses pedestal mount rockers, shims can be placed under the pedestal to reduce the pre-load. The stands on shaft-mounted rockers can also be shimmed in this manner. Longer pushrods will be needed for insufficient pre-load.

In most cases, only one intake and one exhaust pushrod will need to be checked. If the valve stem heights are not equal, then pre-load will have to be checked on each valve. If you do need custom-length pushrods, call CAM HELP® at 1-800-999-0853. COMP Cams® offers a variety of pushrods in most lengths.

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### **Limited Warranty**

Competition Cams, Inc. warrants that all of its products are free from defects in material and workmanship, and against excessive wear for a period of (1) one year from the date of purchase. This **limited warranty** shall cover the original purchaser.

**Competition Cams, Inc.'s obligation under this warranty is limited to the repair or replacement of its product.** To make a warranty claim, the part must be returned within (1) one year of purchase to the address listed below, freight prepaid. Items covered under warranty will be returned to you freight collect.

**It is the responsibility of the installer to ensure that all of the components are correct before installation. We assume no liability for any errors made in tolerances, component selection, or installation.**

**There is absolutely no warranty on the following:**

- A) Any parts used in racing applications;**
- B) Any product that has been physically altered, improperly installed or maintained;**
- C) Any product used in improper applications, abused, or not used in conjunction with the proper parts.**

**There are no implied warranties of merchantability or fitness for a particular purpose.** There are no warranties, which extend beyond the description of the face hereof. Competition Cams, Inc. will not be responsible for incidental and consequential damages, property damage or personal injury damages to the extent permitted by law. Where required by law, implied warranties or merchantability and fitness are limited for a term of (1) one year from the date of original purchase.

This warranty gives you specific legal rights and you may also have other legal rights, which vary from state to state.